worldskills

Technical Description

Digital Construction

Skill 58

WorldSkills International, by a resolution of the Competitions Committee and in accordance with the Constitution, the Standing Orders, and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

1 Introduction

1.1 Name and description of the skill competition

1.1.1 The name of the skill competition is

Digital Construction

1.1.2 Description of the associated work role(s) or occupation(s)

Digital Construction using Building Information Modelling (BIM) is a process for creating and managing information on a construction project across the project lifecycle. One of the key outputs of this process is the digital Building Information Model, the digital description of every aspect of the built asset. This digital model draws on information assembled collaboratively and updated at key stages of a project. Creating a digital Building Information Model enables those who interact with the building to optimize their actions, resulting in a greater whole life value for the asset.

Through Digital Construction, the design and construction industry is utilizing software technologies that collectively come under the heading of BIM. As a result, common processes in the Architecture, Engineering and Construction (AEC) industry, are changing exponentially. This means that existing professions are facing new challenges and new workflows which require new skills.

Collaboration is an essential ingredient to the success of a BIM based project and improving the sustainability of our built environment. Digital Construction demands a high level of interpersonal skills in the form of communication, collaboration and creative problem solving. Digital Construction requires the recruitment of professionals with better transversal skills. The processes provide a platform for all AEC professions to work together and enhance their collective output. This requires for the complex interplay of technical skills, modelling and communication skills, all of which must be at a professional standard.

Building Information Modelling can be defined as using computer systems to assist in the creation, modification, analysis, and optimisation of graphically simulated building information. BIM-based software is used to increase the Digital Construction professionals' productivity, improve the quality and sustainability of design, improve communication through documentation, and create a database for project implementation. The BIM output in the form of digital databases can be shared and collaboratively worked on using cloud-based platforms. The digital models can convey information such as real-world project location while simulating building elements and construction data compiled in accordance with international standards.

The AEC industry is leveraging BIM, and it is already the industry standard for procuring buildings. The associated process and outputs are essential to successful solutions for construction, engineering, and manufacturing problems. BIM's ability to federate or merge digital models allows for clash detection analysis, potentially reducing construction waste. BIM software helps us explore ideas, visualise concepts through photorealistic renderings, and simulates how the BIM driven project will perform in the real world.

The job roles evolving from the embedding of BIM in the industry have exciting implications for future career pathways.

1.1.3 Number of Competitors per team

Digital Construction is a single Competitor skill competition.

1.1.4 Age limit of Competitors

The Competitors must not be older than 25 years in the year of the Competition.

1.2 The relevance and significance of this document

This document contains information about the standards required to compete in this skill competition, and the assessment principles, methods, and procedures that govern the competition.

Every Expert and Competitor must know and understand this Technical Description.

In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

1.3 Associated documents

Since this Technical Description contains only skill-specific information it must be used in association with the following:

- WSI – Code of Ethics and Conduct
- WSI – Competition Rules
- WSI – WorldSkills Occupational Standards framework
- WSI – WorldSkills Assessment Strategy
- WSI online resources as indicated in this document
- WorldSkills Health, Safety, and Environment Policy and Regulations
- WorldSkills Standards and Assessment Guide (skill-specific)

2 The WorldSkills Occupational Standards (WSOS)

2.1 General notes on the WSOS

The WSOS specifies the knowledge, understanding, skills, and capabilities that underpin international best practice in technical and vocational performance. These are both specific to an occupational role and also transversal. Together they should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, to the extent that it can. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills and capabilities that are set out in the WorldSkills Occupational Standards. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, if this does not distort the weightings assigned by the Standards.

2.2 WorldSkills Occupational Standards

Section		Relative importance (%)
1	**Work organization and management**	**5**
	The individual needs to know and understand: • The various purposes and uses for BIM Modelling • Standards currently used and recognised by industry (ISO 19650-1 and 19650-2) • Health and safety legislation and best practice including specific safety precautions when using a visual display unit (VDU) and in a workstation environment • The correlation between the purpose of the information and the level of detail needed to communicate design intent with accuracy and clarity, referring to the Levels of Detail (LODs) and Level of Information Need	

Section		Relative importance (%)
	• The importance of maintaining knowledge and skill in new and developing technologies • The role of providing innovative and creative solutions to technical and design problems and challenges • The importance of working to the deliverables and deadlines of the BEP (BIM execution plan) • The importance of working to the client brief.	
	The individual shall be able to: • Apply the internationally recognised standards and standards currently used and recognised by industry • Apply and promote health and safety legislation and best practice in the workplace • Use and interpret technical terminology and symbols used in preparing and presenting information models, structural and architectural drawings • Use recognised IT systems and related professional design software to consistently produce high quality designs and interpretations • Deal with co-ordination problems such as alerts received due to shared elements that have been modified • Maintain proactive continuous professional development in order to maintain current knowledge and skill in new and developing technologies and practices • Provide and apply innovative and creative solutions to technical and design problems and challenges.	
2	**Communication and interpersonal skills**	**5**
	The individual needs to know and understand: • Technical terminology and symbols • Recognised IT systems and related professional design software • The importance of effective communications and inter-personal skills between co-workers, clients and other related professionals • The different communication styles and how to adapt them to different contexts and audiences • The principles of active listening and effective feedback • The importance of maintaining positive and constructive relationships with team members, clients, and stakeholders.	
	The individual shall be able to: • Access and recognise standard component and symbol libraries • Produce work that consistently meets high standards of accuracy and clarity in the design and presentation of designs and model information to potential users	

Section		Relative importance (%)
	• Use effective communications and inter-personal skills with and between co-workers, clients, and other related professionals to ensure that the BIM process meets the requirements of the BEP • Explain to clients and other professionals the role and purposes of BIM • Explain complex technical images to experts and non-experts, highlighting key elements • Provide a range of visualisations of the desired project in order to fulfil the client's brief accurately • Use effective verbal and written communication skills by adapting them to different contexts and audiences • Practise active listening and provide constructive feedback to co-workers, clients, and other related professionals • Build and maintain positive and constructive relationships with all members of the BIM project team.	
3	**Software and hardware**	**5**
	The individual needs to know and understand: • Computer operating systems to be able to use and manage computer files and software correctly • Peripheral devices used in the digital construction process • Specific specialist technical operations within design software • The workflow for digital construction projects • The limitations of the design software • Formats and resolutions • The role of energy-efficient hardware and software in digital construction and their contribution towards UN SDG 7 (Affordable and Clean Energy).	
	The individual shall be able to: • Power up the equipment and activate the appropriate modelling software • Set up and check peripheral devices such as keyboard, and mouse • Use computer operating systems and specialist software to create, manage, and store files proficiently both locally and to the Common Data Environment (CDE) BIM project • Select correct drawing packages from an on-screen menu or graphical equivalent • Use various techniques for accessing and using BIM software such as a mouse, menu, or tool bar • Configure the parameters of the software.	
4	**Interpretation of the client brief**	**10**
	The individual needs to know and understand: • What information is provided in a client's brief	

Section		Relative importance (%)
	• The importance of the Exchange Information Requirements (EIR) • The importance of the Asset Information Requirements (AIR) of the project • The relevant and current industry standards • How to work from a BEP from the EIR • How to create and edit BIM information within a CDE across the lifecycle of construction • The importance of file structures and sharing protocols within the CDE • How client briefs may incorporate elements related to UN SDGs such as SDG 3 (Good Health and Well-being), SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), and SDG 12 (Responsible Consumption and Production).	
	The individual shall be able to: • Interpret clients' briefs to determine: outline requirements of each project, client goals and locations • Work from BEPs, client briefs and EIRs to address client and project requirements • Create and edit BIM information within CDEs as per BEPs across the lifecycle of construction projects and provide access/set permissions to the necessary folders to the BIM team.	
5	**Building Information Modelling**	**20**
	The individual needs to know and understand: • Programmes used in the BIM authoring and collaboration process • The importance of organising BIM objects into meaningful groups of disciplinary information that can be managed visually • How to create Building Information Models, (Structural and Architectural) • Principles of Technical Design • How to access and use documentation in a BIM project • How to set up a BIM as a collaborative file • How to set up a project location, orientation, and level datum • The use of Work in Progress (WIP) folders or information states • The importance of Information exchanges (Data drops) at key project stages and of working to the requirements of the BEP • How to produce a given detail to current standards • The use of 3D visualisation tools • The principles of creative thinking and problem-solving techniques • The potential benefits and risks associated with innovative approaches • The latest trends and advancements in the field of BIM technology • How to create Building Information Models that are aligned with SDGs, particularly SDGs 3, 7, 8, 11, and 12. For instance, models could include features promoting health and well-being, energy	

Section		Relative importance (%)
	efficiency, sustainable urban planning, and responsible consumption and production • The role of Artificial Intelligence (AI) in the early design stage, including the use of generative design, predictive analytics, and data-driven optimisation to enhance decision-making and improve project outcomes • How AI tools can support rapid scenario testing for sustainable design, such as analysing embodied carbon, solar energy, energy performance, or site impact in real time • How to integrate sustainability goals from the outset of the design process, using BIM and AI technologies to balance environmental, economic, and social considerations • How to apply problem-solving frameworks in real-world BIM scenarios, including resolving coordination clashes, data inconsistencies, or design constraints using appropriate digital tools.	
	The individual shall be able to: • Open an appropriate Project Information Model (PIM) from the relevant directory within the CDE • Populate Project Properties with given information • Set each model up as collaborative files • Create work sets • Set each project location, orientation and level datum • Create each structural grid • Create BIM models as per given drawings • Save each BIM model with a prescribed starting view • Save each PIM within the CDE for use by the other disciplines via construction cloud software • Adhere to the requirements of the BEP to ensure data drops are made via the construction cloud software • Produce scaled detailed drawings to the required standard using callout and details items • Create 3D visuals to illustrate each building from different viewpoints • Apply problem-solving techniques to overcome challenges that arise during the BIM modelling process • Use creative and innovative thinking to propose improvements in the BIM process and to solve technical and design problems • Stay abreast of and apply the latest trends and advancements in BIM technology to increase efficiency and quality of models • Use AI-assisted tools to generate and evaluate early-stage design options, including layout optimisation, space planning, and energy performance analysis • Analyse and compare sustainable design strategies using AI-powered simulations for daylighting, solar energy, energy efficiency, embodied carbon, and environmental impact	

Section		Relative importance (%)
	• Apply sustainable design principles by integrating BIM with SDG-aligned goals, including promoting well-being, responsible material use, and urban sustainability.	
6	**Model coordination**	**15**
	The individual needs to know and understand: • How to federate different discipline models with the same model format • What a hard and soft clash is and how to use the BEP to ensure requirements/responsibilities are achieved and perform a clash inspection • How to upload and report issues to BIM project and the CDE • How to perform and record details of a visual clash inspection • How the coordination of different models can contribute to the achievement of the SDGs by reducing waste and inefficiencies (SDG 12), promoting energy efficiency (SDG 7), or creating healthier environments (SDG 3).	
	The individual shall be able to: • Federate structural, architectural, and specialist designer project models • Perform Clash Inspections as per the BEP • Export all tests as per the BEP and issue to the CDE • Save and issue federated files as per the BEP • Quality assure each federated project model by visually inspecting each CDE hosted model • Identify issues with coordination in each new build that haven't shown up in the three clash tests • For each issue discovered: ◦ Create the issue ◦ Add annotation describing the issue ◦ Assign the issue to the BIM Manager on the project ◦ Name each view as per the BEP.	
7	**Asset information modelling**	**15**
	The individual needs to know and understand: • How to use Current Documentation standards for BIM • How to populate each model with structural asset data • How to apply classification standards for model elements • How to create IFC data sheets • How to populate models with data related to the sustainability and energy efficiency of assets (SDG 7, SDG 12) and the promotion of health and well-being (SDG 3).	

Section		Relative importance (%)
	The individual shall be able to: • Update PIMs from the published directory • Ensure all required assets have the required data populated as per the latest standard • Add classification information to each model elements – referring to the project BEP • Create COBie and IFC data from BIM model elements.	
8	**Data creation and management**	**20**
	The individual needs to know and understand: • The importance of data creation and extraction from the digital model for use by stakeholders in the project • How to create a Shared Parameter file for custom data requirements • How to create schedules of project information with customised data fields • How to use filters with parameters to visually express custom data requirements • How to create a visualisation that expresses statutory regulations around fire and/or thermal u-values or similar • How to plot a sheet to PDF format • Basic understanding and ability in visual programming • The use of ACC Insight to visualise data within the CDE • How to use quantity take off tools • The concept of sustainability in digital construction and the role of BIM in supporting sustainable practices • The potential impact of construction projects on the environment and how BIM can help to mitigate these impacts • The principles of lifecycle analysis and how this can be incorporated into the BIM process • How data extraction from digital models can be used to track and improve performance against the SDGs.	
	The individual shall be able to: • Create Shared Parameter files with custom parameters for selected building elements • Create Custom Tags to visually express technical information from custom parameters • Create colour filters to visually express technical information from the custom parameters on duplicate plans, sections and 3D cut sections • Create schedules of project information including custom parameters • Plot PDF sheet sets of combined PDFs to correct scale and correct sheet sizes • Run visual scripts to automate data extraction	

Section		Relative importance (%)
	• Visualise data with dashboards within the CDE • Take off quantities from PDF and 3D models • Incorporate sustainability considerations into the data creation and management process • Use BIM to support decision-making that reduces the environmental impact of construction projects • Carry out lifecycle analysis as part of the BIM process to support sustainable decision-making.	
9	**Site execution**	**5**
	The individual needs to know and understand: • How to publish construction documents for construction • How to create and complete digital safety checklists for construction sites • How to track construction site issues and assign them to stakeholders • How to set up meetings, record outcomes, and assign action items to meeting attendees • How to manage assets and track assets for construction sites • How site execution practices can contribute to the achievement of the SDGs, for instance through promoting safety and well-being (SDG 3), ensuring sustainable asset management (SDGs 7 and 12), and fostering decent work conditions (SDG 8).	
	The individual shall be able to: • Publish construction documents for construction • Create and complete digital safety checklists for construction site • Track construction site issues and assign them to stakeholders • Set up meetings, protocol outcomes, and assign action Items to meeting attendees • Manage assets and track assets for construction sites.	
	Total	**100**

3 The Assessment Strategy and Specification

3.1 General guidance

Assessment is governed by the WorldSkills Assessment Strategy. The Strategy establishes the principles and techniques to which WorldSkills assessment and marking must conform.

Expert assessment practice lies at the heart of the WorldSkills Competition. For this reason, it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the WorldSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the WorldSkills Competition falls into two broad types: Measurement and Judgement. For both types of assessment, the use of explicit benchmarks against which to assess each Aspect is essential to guarantee quality.

The Marking Scheme must follow the weightings within the Standards. The Test Project is the assessment vehicle for the skill competition, and therefore also follows the Standards. The CIS enables the timely and accurate recording of marks; its capacity for scrutiny, support, and feedback is continuously expanding.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed, developed, and verified through an iterative process, to ensure that both together optimize their relationship with the Standards and the Assessment Strategy. They will be agreed by the Experts and submitted to WSI for approval together, to demonstrate their quality and conformity with the Standards.

Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors for quality assurance and to benefit from the capabilities of the CIS.

4 Assessment Design and Practice

4.1 General guidance

This section describes the role and place of the Marking Scheme, how the Experts will assess Competitors' work as demonstrated through the Test Project, and the procedures and requirements for marking.

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standard that represents each skill competition, which itself represents a global occupation. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards.

By reflecting the weightings in the Standards, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill competition and its assessment needs, it may initially be appropriate to develop the Marking Scheme in more detail as a guide for Test Project design. Alternatively, initial Test Project design can be based on the outline Marking Scheme. From this point onwards the Marking Scheme and Test Project should be developed together.

Section 2.1 above indicates the extent to which the Marking Scheme and Test Project may diverge from the weightings given in the Standards, if there is no practicable alternative.

For integrity and fairness, the Marking Scheme and Test Project are increasingly designed and developed by one or more Independent Test Project Designer(s) with relevant expertise. In these instances, the Marking Scheme and Test Project are unseen by Experts until immediately before the start of the skill competition, or competition module. Where the detailed and final Marking Scheme and Test Project are designed by Experts, they must be approved by the whole Expert group prior to submission for independent validation and quality assurance. Please see the Competition Rules for further details.

Experts and Independent Test Project Designers are required to submit their Marking Schemes and Test Projects for review, verification, and validation well in advance of completion. They are also expected to work with their Skill Advisor, reviewers, and verifiers, throughout the design and development process, for quality assurance and in order to take full advantage of the CIS's features.

In all cases a draft Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition. Skill Advisors actively facilitate this process.

4.2 Assessment Criteria

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived before, or in conjunction with, the Test Project. In some skill competitions the Assessment Criteria may be similar to the section headings in the Standards; in others they may be different. There will normally be between five and nine Assessment Criteria. Whether or not the headings match, the Marking Scheme as a whole must reflect the weightings in the Standards.

Assessment Criteria are created by the person or people developing the Marking Scheme, who are free to define the Criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I). **The Assessment Criteria, the allocation of marks, and the assessment methods, should not be set out within this Technical Description. This is because the Criteria, allocation of marks, and assessment**

methods all depend on the nature of the Marking Scheme and Test Project, which is decided after this Technical Description is published.

The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria and Sub Criteria.

The marks allocated to each Criterion will be calculated by the CIS. These will be the cumulative sum of marks given to each Aspect within that Assessment Criterion.

4.3 Sub Criteria

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a WorldSkills marking form. Each marking form (Sub Criterion) contains Aspects to be assessed and marked by Measurement or Judgement, or both Measurement and Judgement.

Each marking form (Sub Criterion) specifies both the day on which it will be marked, and the identity of the marking team.

4.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked, together with the marks, and detailed descriptors or instructions as a guide to marking. Each Aspect is assessed either by Measurement or by Judgement.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it. The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the Standards. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4.1 refers.)

		CRITERIA								TOTAL MARKS PER SECTION	WSSS MARKS PER SECTION	VARIANCE
		A	B	C	D	E	F	G	H			
STANDARDS SPECIFICATION SECTION	1	5.00								5.00	5.00	0.00
	2		2.00					7.50		9.50	10.00	0.50
	3								11.00	11.00	10.00	1.00
	4			5.00						5.00	5.00	0.00
	5				10.00	10.00	10.00			30.00	30.00	0.00
	6		8.00	5.00				2.50	9.00	24.50	25.00	0.50
	7			10.00				5.00		15.00	15.00	0.00
TOTAL MARKS		5.00	10.00	20.00	10.00	10.00	10.00	15.00	20.00	100.00	100.00	2.00

4.5 Assessment and marking

There is to be one marking team for each Sub Criterion, whether it is assessed and marked by Judgement, Measurement, or both. The same marking team must assess and mark all Competitors. Where this is impracticable (for example where an action must be done by every Competitor simultaneously, and must be observed doing so), a second tier of assessment and marking will be put in place, with the approval of the Competitions Committee Management Team. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (Section 4.6 refers.)

4.6 Assessment and marking using Judgement

Judgement uses a scale of 0-3. To apply the scale with rigour and consistency, Judgement must be conducted using:

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts, or separate guidance notes). This is documented in the Standards and Assessment Guide.
- the 0-3 scale to indicate:
  - 0: performance below industry standard
  - 1: performance meets industry standard
  - 2: performance meets and, in specific respects, exceeds industry standard
  - 3: performance wholly exceeds industry standard and is judged as excellent

Three Experts will judge each Aspect, normally simultaneously, and record their scores. A fourth Expert coordinates and supervises the scoring, and checks their validity. They also act as a judge when required to prevent compatriot marking.

4.7 Assessment and marking using Measurement

Normally three Experts will be used to assess each Aspect, with a fourth Expert supervising. In some circumstances the team may organize itself as two pairs, for dual marking. Unless otherwise stated, only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect. To avoid errors in calculation or transmission, the CIS provides a large number of automated calculation options, the use of which is mandated.

4.8 The use of Measurement and Judgement

Decisions regarding the choice of criteria and assessment methods will be made during the design of the competition through the Marking Scheme and Test Project.

4.9 Skill assessment strategy and procedures

WorldSkills is committed to continuous improvement including reviewing past limitations and building on good practice. The following skill assessment strategy and procedures for this skill competition take this into account and explain how the marking process will be managed.

- The primary aim of the Skill assessment strategy and procedures is to ensure a fair, transparent, objective, and reliable assessment process, promoting excellence in skills and providing a level playing field for all Competitors.
- This skill competition is classed as "fault finding" on all days. Therefore, no Expert and Competitor communication during the competition time, including breaks and lunch period, are allowed. For official Compatriot Communication, Competition Rules 7.3.3 is strictly applied.
- In accordance with WorldSkills Rules and guidance, on C-4 and C-3 Mandatory Assessment Training will include practical assessments of each Experts' expertise both technically, and in assessment and marking. Following this, the Chief Expert and Skill Competition Manager will determine who will assess, and who will have the opportunity to enhance their expertise through observation.
- Marking Teams are based on Sub Criteria, which in turn will reflect the weightings in the WorldSkills Occupational Standards (WSOS). The criteria for determining which Marking Team

will mark each Sub Criteria is in the Competition's assessment plan as well as the organization and timing of each module.

- To ensure the highest standards of marking consistency, a periodic review of marked tasks will be conducted by the Chief Expert or designated Experts Leads. Any discrepancies in marking will be discussed and resolved collectively.
- One Marking Team must mark every aspect within the sub criterion.
- Where appropriate, technology-assisted assessment tools may be utilized to ensure consistency and accuracy in the marking process. However, the final decision on marks awarded will always lie with the Marking Teams.
- In accordance with the Rules, there is no blind marking and no compatriot marking. The composition of each Marking Team will ensure that these restrictions are adhered to.
- All Experts involved in the assessment process must declare any potential conflicts of interest. Steps will be taken to ensure that no Expert is placed in a position where their impartiality could be compromised.
- All assessment decisions, especially those requiring deliberation, will be documented meticulously to ensure transparency and to serve as a reference for any post-competition reviews or appeals.
- Exceptions to the rules are permissible only with the agreement of the Chair and Vice Chair of the Competitions Committee. The Skill Advisor must be contacted if this possibility is raised due to a lack of Experts with the required expertise.
- Post-competition, a feedback mechanism will be instituted where both Experts and Competitors can provide insights into the assessment process. This feedback will be invaluable for continuous improvement and refinement of future skill assessments.

5 The Test Project

5.1 General notes

Sections 3 and 4 govern the development of the Test Project. These notes are supplementary.

Whether it is a single entity, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the applied knowledge, skills, and behaviours set out in each section of the WSOS.

The purpose of the Test Project is to provide full, balanced, and authentic opportunities for assessment and marking across the Standards, in conjunction with the Marking Scheme. The relationship between the Test Project, Marking Scheme, and Standards will be a key indicator of quality, as will be its relationship with actual work performance.

The Test Project will not cover areas outside the Standards or affect the balance of marks within the Standards other than in the circumstances indicated by Section 2. This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standards. Section 2.1 refers.

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work. The Test Project will not assess knowledge of WorldSkills rules and regulations.

Most Test Projects and Marking Schemes are now designed and developed independently of the Experts. They are designed and developed either by the Skill Competition Manager, or an Independent Test Project Designer, normally from C-12 months. They are subject to independent review, verification, and validation. (Section 4.1 refers.)

The information provided below will be subject to what is known at the time of completing this Technical Description, and the requirement for confidentiality.

Please refer to the current version of the Competition Rules for further details.

5.2 Format/structure of the Test Project

The Test Project is a series of standalone modules which are assessed over four days. These modules are intended to reflect the WorldSkills Occupational Standards (WSOS). The Test Project may consist of some or all the modules. These possible modules and a sample of associated tasks are outlined below.

Module 1 – Digital Construction: BIM Setup

Sample tasks:

- Set up the Common Data Environment with adherence to BEP and ISO19650 Standards Series;
- Populate BIM model with project-specific information following BEP guidelines;
- Etc.

Module 2 – Digital Construction: Modelling and Collaboration

Sample tasks:

- Develop a work-shared Architectural BIM Model as instructed by the BEP;
- Federate structural, architectural, and specialist designer projects within the CDE;
- Etc.

Module 3 – Digital Construction: Model Coordination

Sample tasks:

- Establish an Interdisciplinary Cloud Coordination Space for clash detection purposes;
- Conduct Hard Clash Inspections in line with BEP directives;
- Assure the quality of the federated project model with a comprehensive 'Walk around' of the CDE hosted model;
- Etc.

Module 4 – Digital Construction: Corrective Modelling

Sample tasks:

- Pinpoint coordination issues in the new build that were overlooked in hard clash tests;
- Refresh Project Information Models using data from the official directory;
- Etc.

Module 5 – Digital Construction: Asset Information Management

Sample tasks:

- Validate that all assets are populated with the essential COBie data;
- Implement classification info to model elements, making reference to the project BEP;
- Etc.

Module 6 – Digital Construction: Documentation and File Export

Sample tasks:

- Generate dimensioned Floor Plan drawings and elevation sketches from the updated federated project model;
- Design custom tags to depict technical data extracted from the specific parameters visually;
- Finalize and export a sheet set as a PDF, submitting it through BEP to CDE;
- Etc.

Module 7 – Digital Construction: Data Analytics and Automation

Sample tasks:

- Draft a Document Management Issue Summary Report as specified by BEP;
- Evaluate the quality of a given BIM Model;
- Use visual programming techniques to automate a chosen recurring task;
- Etc.

Module 8 – Digital Construction: Schedules and Quantities

Sample tasks:

- Formulate schedules that display project info, inclusive of customized parameters;
- Illustrate a project's progression using an animated timeline;
- Define take-off packages derived from 2D designs and a 3D BIM Model;
- Etc.

Module 9 – Digital Construction: Site Execution

Sample tasks:

- Disseminate files necessary for site execution;
- Design and finalize a digital safety checklist tailored for the Construction Site;

• Manage, monitor, and maintain assets pivotal to the Construction site's operations;
• Etc.

Module 10 – Digital Construction: Sustainability and Green Building

Sample tasks:

• Analyze embodied carbon for supporting the use of sustainable materials into BIM models;
• Simulate energy consumption using BIM to identify energy-saving opportunities;
• Etc.

Module 11 – Digital Construction: Visualization and Immersive Technologies

Sample tasks:

• Simulate construction processes in Virtual Reality for training and safety purposes;
• Integrate VR walkthroughs for stakeholders to visualize end-project outcomes;
• Etc.

5.3 Test Project design requirements

Test Projects should reflect the purposes, structures, processes, and outcomes of the occupational role they are based on. They should aim to be a small-scale version of that role. Before focusing on practicalities, SMTs should show how the Test Project design will provide full, balanced, and authentic opportunities for assessment and marking across the Standards, as set out in Section 5.1.

Purpose and Alignment with Occupational Role

The primary intent of Test Projects is to closely mirror the real-world scenarios, challenges, and practices of the occupational role upon which they're based. The projects should not only capture the core essence of the role but also serve as a microcosm of real-world tasks, responsibilities, and demands.

Holistic Design

The Test Projects should provide a comprehensive testing ground that encompasses both theoretical and practical components, emphasizing not only the technical proficiencies but also soft skills like problem-solving, teamwork, and sustainable practices.

Authenticity and Relevance

It's imperative that the Test Projects remain relevant to current industry standards and practices. As such, they should integrate contemporary tools, software, and methodologies used in the field of digital construction. These projects should be designed in a way that they could theoretically be executed in a real-world scenario.

Balance and Coverage

The Test Projects need to provide balanced opportunities for assessment across all competencies set out in Section 5.1. This means ensuring no single competency is over-represented or under-represented. The weightage of each competency within the Test Project should be aligned with its significance in the actual occupational role.

Flexibility and Adaptability

Recognizing the rapid evolution of digital construction, Test Projects should be designed with a degree of flexibility. This will allow the incorporation of new technologies or methodologies that may emerge close to the assessment time, ensuring the test remains updated and relevant.

Validation and Feedback Loop

Once designed, the Test Projects should undergo a validation process, perhaps through pilot testing or peer review, to identify potential gaps or areas of improvement. Feedback should be incorporated iteratively to refine and enhance the project's effectiveness.

Documentation and Clarity

All Test Projects should come with detailed documentation outlining objectives, expected outcomes, tools/software to be used, and evaluation criteria. This ensures that both the assessors and the individuals being tested have a clear understanding of what's expected.

Inclusion of Real-world Challenges

To further ensure authenticity, the Test Projects can integrate real-world challenges that professionals might face, such as unexpected changes, resource limitations, or the need for rapid problem-solving.

Ethical and Sustainable Considerations

Given the increasing emphasis on sustainability and ethics in construction, Test Projects should also include elements that test the individual's knowledge and application of sustainable practices and ethical considerations.

Conclusion

In summary, while practicalities are vital, the overarching goal of the Test Project design should always be to craft an authentic, balanced, and comprehensive representation of the occupational role, providing a rigorous and fair ground for assessment.

5.4 Test Project coordination and development

The Test Project MUST be submitted using the templates provided by WorldSkills International (www.worldskills.org/expertcentre). Use the Word template for text documents and DWG template for drawings.

5.4.1 Test Project coordination (preparation for Competition)

Coordination of the Test Project/modules will be undertaken by the Skill Competition Manager.

5.4.2 Who develops the Test Project/modules

The Test Project/modules are developed by an Independent Test Project Designer (ITPD) in collaboration with the Skill Competition Manager.

5.4.3 When is the Test Project developed

The Test Project/modules are developed according to the following timeline:

Time	Action
Fifteen (15) months prior to the Competition	The ITPD is identified and a Confidentiality Agreement between WSI and the ITPD is organized.
Two (2) months before the Competition	The Test Project documents are sent to the WorldSkills International Skills Competitions Administration Manager.
At the Competition at the beginning of each module	The Test Project/modules are presented to Experts and Competitors.

5.5 Test Project initial review and verification

The purpose of a Test Project is to create a challenge for Competitors which authentically represents working life for an outstanding practitioner in an identified occupation. By doing this, the Test Project will apply the Marking Scheme and fully represent the WSOS. In this way it is unique in its context, purpose, activities, and expectations.

To support Test Project design and development, a rigorous quality assurance and design process is in place (Competition Rules sections 10.6-10.7 refer.) Once approved by WorldSkills, the Independent Test Project Designer (ITPD) is expected to identify one or more independent expert(s), and trusted individuals initially to review the Independent Test Project Designer's ideas and plans, and subsequently to verify the Test Project, prior to validation.

A Skill Advisor will ensure and coordinate this arrangement, to guarantee the timeliness and thoroughness of both initial review, and verification, based on the risk analysis that underpins Section 10.7 of the Competition Rules.

5.6 Test Project validation

The Skill Competition Manager coordinates the validation of the Test Project/modules and will ensure that it can be completed within the material, equipment, knowledge, and time constraints of Competitors.

5.7 Test Project circulation

The Test Project/modules are not circulated prior to the Competition. The Test Project/modules are presented to Experts and Competitors at the beginning of each module.

5.8 Test Project change

Due to the Test Project being developed by an Independent Test Project Designer (ITPD), there is no change required to be made to the Test Project/modules at the Competition. Exceptions are amendments to technical errors in the Test Project documents and according to infrastructure limitations.

5.9 Material or manufacturer specifications

Specific material and/or manufacturer specifications required to allow the Competitor to complete the Test Project will be supplied by the Competition Organizer and are available from www.worldskills.org/infrastructure located in the Expert Centre. However, note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These items may include those for fault finding modules or modules not circulated.

6 Skill management and communication

6.1 Discussion Forum

Prior to the Competition, all discussion, communication, collaboration, and decision making regarding the skill competition must take place on the WorldSkills skill-specific Discussion Forum. (http://forums.worldskills.org). Skill related decisions and communication are only valid if they take place on the WorldSkills Discussion Forum. The Chief Expert (or an Expert Lead appointed by the Skill Management Team) will be the moderator for this Discussion Forum. Refer to the Competition Rules for the timeline of communication and competition development requirements.

6.2 Competitor information

All information for registered Competitors is available from the Competitor Centre (www.worldskills.org/competitorcentre).

This information includes:

- Competition Rules
- Technical Descriptions
- Mark Summary Form (where applicable)
- Test Projects (where applicable)
- Infrastructure List
- WorldSkills Health, Safety, and Environment Policy and Regulations
- Other Competition-related information

6.3 Test Projects and Marking Schemes

Circulated Test Projects will be available from www.worldskills.org/testprojects and the Competitor Centre (www.worldskills.org/competitorcentre).

6.4 Day-to-day management

The day-to-day management of the skill competition during the Competition is defined in the Skill Management Plan that is created by the Skill Management Team. The Skill Management Team comprises the Skill Competition Manager, Chief Expert, and the Expert Leads. The Skill Management Plan is progressively developed in the six (6) months prior to the Competition and finalized at the Competition. The Skill Management Plan can be viewed in the Expert Centre (www.worldskills.org/expertcentre).

6.5 General best practice procedures

General best practice procedures clearly delineate the difference between what is a best practice procedure and skill-specific rules (section 9). General best practice procedures are those where Experts and Competitors CANNOT be held accountable as a breach to the Competition Rules or skill-specific rules which would have a penalty applied as part of the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System. In some cases, general best practice procedures for Competitors may be reflected in the Marking Scheme.

Topic/task	Best practice procedure
Equipment failure	• In the occurrence of unintentional hardware or software failure Competitors must notify Experts immediately by raising their hand. Experts will take note of the time that the Competitor is not able to make use of their equipment. Any time lost due to equipment failure is provided to the Competitor at the end of the standard module time. No additional time is granted for work not saved prior to the equipment failure.
Communication and contact between compatriot Expert and Competitor	• No communication during breaks or lunch time between Expert/ Interpreter and Competitor. • Competitor and compatriot Expert/Interpreter cannot be outside the competition area at same time unless is approved by Chief Expert.

7 Skill-specific safety requirements

7.1 Personal Protective Equipment

Refer to WorldSkills Safety Policy and Regulations for Host country or region regulations.

Topic/task	Sturdy shoes with closed toe and no heel	Earplug
General PPE for safe areas	√	
Competitor workstations		√

8 Materials and equipment

8.1 Infrastructure List

The Infrastructure List details all equipment, materials, and facilities provided by the Competition Organizer.

The Infrastructure List is available at www.worldskills.org/infrastructure.

The Infrastructure List specifies the items and quantities requested by the Skill Management Team for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These items may include those for fault finding modules or modules not circulated.

At each Competition, the Skill Management Team must review and update the Infrastructure List in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition for the upcoming WorldSkills Competition.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

8.2 Competitors toolbox

Competitors are not allowed to send a toolbox to the Competition. All tools are provided by the Competition Organizer.

8.3 Materials, equipment, and tools supplied by Competitors

It is not applicable for Competitors to bring materials, equipment, and tools to the Competition. However, Competitors are allowed to bring some items in the morning of C-2 on Familiarization Day and throughout the competition, subject to a toolbox check and SMT approval, as defined in the table below:

It is recommended that these items be brought in the luggage of the Competitor or purchased locally.

Furthermore, Competitors are required to supply their own Personal Protective Equipment as specified in section 7 skill-specific safety requirements.

Description	Quantity	Photo
Instruments for freehand sketching	1	

Description	Quantity	Photo
		
Personal keyboard and mouse (including drivers), if different than the ones supplied by Host Member	1	
"Space Mouse" (3D Mouse) is allowed. Different electronic equipment must be presented to the Expert team for validation	1	

8.4 Materials, equipment, and tools supplied by Experts

Experts are required to supply their own Personal Protective Equipment as specified in section 7 skill-specific safety requirements.

Experts are responsible that Interpreters bring their own PPE.

8.5 Materials and equipment prohibited in the skill area

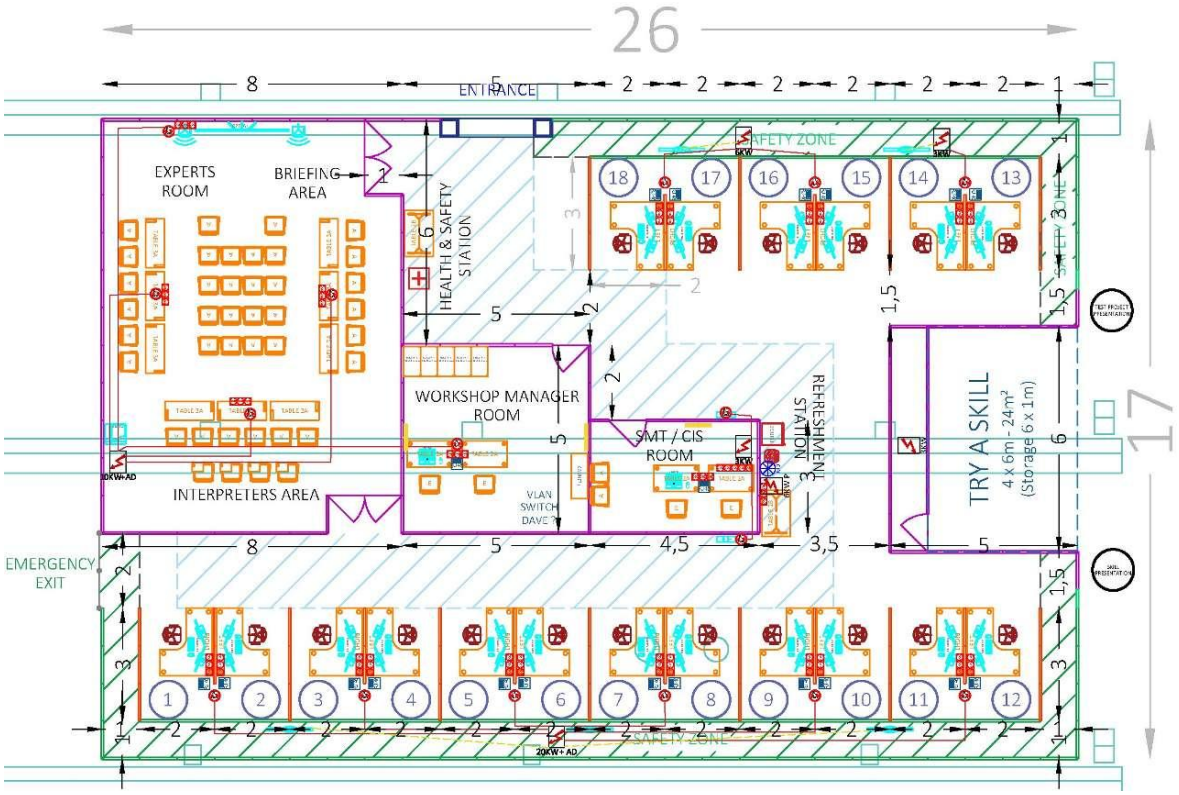
Competitors and Experts are prohibited to bring any materials or equipment not listed in section 8.3 and section 8.4.

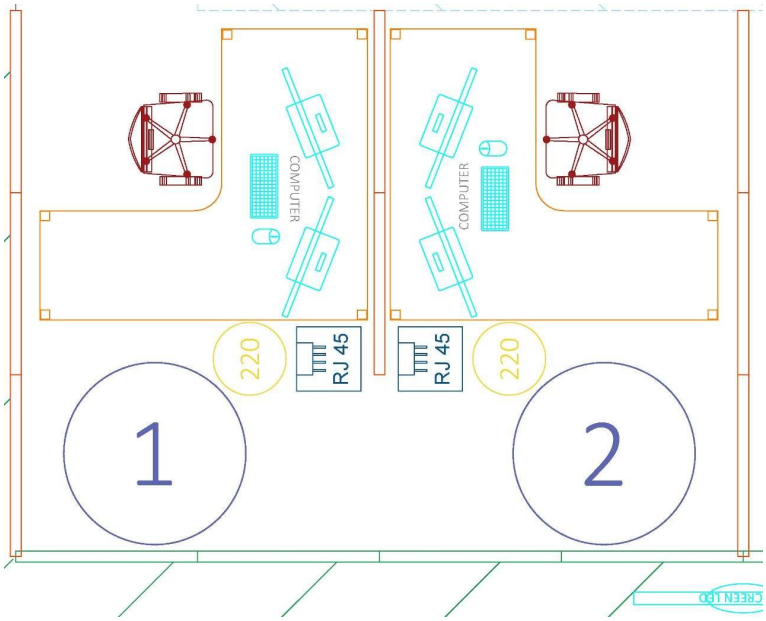
Wireless Headphones are not allowed.

8.6 Proposed workshop and workstation layouts

Workshop layouts from previous competitions are available at www.worldskills.org/sitelayout.

Example workshop layout





9 Skill-specific rules

9.1 General notes

Skill-specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from skill competition to skill competition. This includes but is not limited to personal IT equipment, data storage devices, Internet access, procedures and workflow, and documentation management and distribution. Breaches of these rules will be solved according to the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System.

9.2 Skill-specific rules

Topic/task	Best practice procedure
Use of technology – USB, memory sticks	• No external memory devices are to be connected to the competition computer unless under the supervision of the Chief Expert. • Competitors are not allowed to load any digital data to their competition computers.
Use of technology – personal laptops, tablets, and mobile phones	• Skill Competition Manager, Chief Expert, Experts, and Interpreters are allowed to use personal laptops, tablets and mobile phones in the Expert room only. • Competitors are not allowed to bring communication devices, personal laptops, tablets, or mobile phones into the workshop. If these items are brought, they are to be locked in the personal locker and can be removed at the end of the day only.
Use of technology – personal photo and video taking devices	• The use of personal photo and video taking devices is forbidden in the workshop.
Drawings, recording information	• Competitors are not permitted to bring notes into the workshop under any circumstances. All notes made at the Competitor workstation must remain on the Competitors desk at all times. No notes may be taken outside of the workshop until the Competition has concluded on C4. Notes and checklists can be brought in to the work area on familiarization days, however, they must be removed from work area when leaving that day.

10 Expert knowledge and experience

10.1 Requirements

Experts appointed for this skill competition must have the following knowledge and experience for the appropriate occupation or work role as documented in **section 1.1.2**.

- **Minimum Qualification**: A diploma, degree, or equivalent qualification in the built environment, or in education.
- **Relevant Industry or education Experience**: At least five years of practical experience in digital construction, or technical instruction in a vocational or higher education setting with a focus on digital construction. This must include direct involvement in digital project delivery, or technical training.
- **Advanced Software Proficiency**: Proficient use of industry-standard digital construction software, including Autodesk Revit, Navisworks, and Construction Cloud (ACC). Capable of producing, reviewing, and assessing technically accurate digital outputs using these tools.
- **Knowledge of BIM Standards and Protocols**: Demonstrated understanding of international BIM standards such as ISO 19650-1 and 19650-2, and their application within BIM workflows, and structured data environments.
- **Experience with CDE and Collaboration Workflows**: Technical knowledge of CDEs, including model sharing, federated model coordination, issue tracking, and permissions management using platforms such as ACC.
- **Model Coordination and Clash Detection**: Technical expertise in federating models across disciplines, running clash detection tests, interpreting results, and applying BEP-compliant coordination workflows.
- **Asset Information and Data Management**: Ability to validate asset data, apply classification systems (e.g. IFC, Uniclass, OmniClass), and generate structured outputs and parameter-driven schedules.
- **Automation and Data Analysis**: Some understanding of visual programming and automation techniques (e.g. Dynamo scripts) for data extraction, model auditing, and productivity improvement.
- **Application of Sustainability Metrics**: Technical ability to assess sustainability-related data within BIM outputs, including energy performance indicators, lifecycle information, and support for SDG-aligned outcomes.
- **WorldSkills Technical Familiarity** *(Preferred)*: Prior technical involvement in the WorldSkills Digital Construction competition cycle (regional, national, or international), including tasks such as technical training, Test Project development, assessment design, judging, or model validation in accordance with WSOS criteria.

11 Visitor and media engagement

11.1 Engagement methods

Following is a list of possible ways to maximize visitor and media engagement:

- Try-a-Skill;
- Display screens;
- Test Project descriptions;
- Enhanced understanding of Competitor activity;
- Competitor profiles;
- Career opportunities;
- Daily reporting of competition status;
- Virtual Reality experience;
- Sponsors booth.

12 Sustainability

12.1 Sustainable practices

This skill competition will focus on the sustainable practices below:

- Recycling;
- Use of "green" materials;
- Use of completed Test Projects after Competition;
- Use of digital information instead of paper.

13 References for industry consultation

13.1 General notes

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (http://www.ilo.org/public/english/bureau/stat/isco/isco08/)
- ESCO: (https://ec.europa.eu/esco/portal/home)
- O*NET OnLine (www.onetonline.org/)

13.2 References

This WSOS falls with the following broad category: ICT Information and Knowledge Manager: http://data.europa.eu/esco/occupation/810e5e67-acd5-499a-b307-cf5bea330859

and aligns more closely with Computer User Support Specialists: https://www.onetonline.org/link/summary/15-1232.00

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Shanghai 2026.

Organization	Contact name
ArchOffice	Clemens Resch, GF

14 Appendix

14.1 Appendix information

Not applicable.